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AUTHOR	Thoeny, Alan R.; Horton, Frank B., III
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ABSTRACT

An attempt is made in this working paper to synthesize the existing empirical evidence concerning the utility of simulation games in social studies teaching, training, and research. The data are drawn from several sources: published literature dealing with simulation games, descriptions of games in use, communications with people who use games, and personal experience with the design and use of games for education. The independent variables that seem likely to be related to the costs and benefits of simulation are delineated: 1) purpose; and, 2) structure including a discussion of goals, rules, team system, internal structure of the teams, and participants. These dependent variables are also discussed: 1) learning motivation; 2) the discovery, verification or inculcation of social facts and principles; and, 3) the development of skills or discovery of hypotheses regarding decision-making, manipulative skills, and interactive behavior. The disparity between the positive and negative evaluations of simulation in terms of these variables is explained as resulting from a lack of empirical or objective research, and the perception of the weaknesses of simulation games --lack of teacher control over learning, scheduling difficulty, and cost. (SBE)

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SIMULATION GAMES IN SOCIAL SCIENCE TEACHING & RESEARCH: AN INTERIM REPORT

Alan R. Thoeny and Frank B. Horton III
Department of Political Science, USAFA

Simulation games, characterized by the replication of key features of some aspect of the real world as a context for a contest according to set rules, have long been used for education and research. These games have taken different forms and emphasized different purposes in different cultures. Until recently, their principal use in the post-Renaissance West has been to serve as an adjunct to military training and research in the form of war games. The RAND Corporation's political/military games, originally developed in 1954, and various management games, designed and used by business schools since the 1950's, expanded the traditional Western concern to include a broader spectrum of the social sciences. Simulation games have since met with enthusiastic acceptance in many social science fields, although those related to international relations and business education have been in use for the longest period and comprise the bulk of present empirical evidence now available, and hence the bulk of that which forms the basis of the present paper.[1]

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1. On the distinction between simulations and games see Sarane S. Boocock; "From Luxury Item to Learning Tool: An Overview of the Theoretical Literature on Games," Simulations Games & Learning, ed. by Sarane S. Boocock and E. O. Schild; Sage Publications, Inc., Beverly Hills, California; 1968. On the role of games in different cultures, see Roger Caillois; "Man, Play, and Games"; The Free Press, New York, N. Y.; 1961. Several sources treat the development of war gaming; e.g., John P. Young; "A Survey of Historical Developments in War Games"; Operations Research Office, Johns Hopkins University, Bethesda, Maryland; 1960. Clark Abt; "War Gaming"; International Science and Technology; August, 1964, pp. 29-37; and Clayton J. Thomas; "Military Gaming," in Progress in Operational Research, Vol. I, ed. by Russel L. Ackoff; John Wiley & Sons, Inc., New York, N. Y.; 1961. On the RAND development, see Herbert Goldhamer and Hans Speier; "Some Observations on Political Gaming," in Game Theory & Related Approaches to Social Behavior, ed. by Martin Shubik; John Wiley & Sons, Inc.; 1964, pp. 261-272.

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With fifteen years of experience one might expect that we would know quite a bit about the efficacy of simulation games in social science research and education, but we don't. What we do have is an inventory of often contradictory propositions about their value. While often based upon first-hand observation, these propositions are seldom if ever the result of scientific study. This is beginning to change. As Sarane S. Boocock has pointed out, the field of simulation gaming has passed through three phases since the 1950's: acceptance on faith through 1962 or 1963, a "post-honeymoon" period during the years 1963 through 1965 when the first crude attempts to evaluate games led to inconclusive results and disenchantment, and the present period of "realistic optimism" based upon accumulated experience and further experimentation.[2]

This paper, an interim effort, attempts to synthesize the existing empirical evidence concerning the utility of simulation games in social studies teaching, training, and research. Our data are drawn from several sources: published literature dealing with simulation games, descriptions of simulation games in use, communications with fellow gamers, and our own experience with the design and use of simulation games for education. At the moment, the best we can do is to offer a preliminary codification of the present confusion through a delineation of the independent variables that seem likely to be related to the costs and benefits of simulation games and of preliminary assessment and their advantages and disadvantages. Our final study will attempt a more rigorous causal connection between the two sections of the present paper based on an extensive survey effort that is now under way.

A Taxonomy of Simulation Games

A delineation of potentially significant independent variables must begin with "purpose" which both affects and defines the dependent variables developed under "Advantages" and "Disadvantages" below. The purpose of simulation games may be either to teach, to impart knowledge and understanding of a body of information or to inculcate a set of attitudes or a system of values relating to the social system; to train, to impart a set of skills relative to the manipulation of the social environment; or to contribute to research, to lead to the discovery or

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2. Sarane S. Boocock and E. O. Schild; "Introduction," in Simulation Games and Learning, ed. by Sarane S. Boocock and E. O. Schild; Sage Publications, Inc., Beverly Hills, California; 1968, pp. 13-26.

confirmation of the possibility of probabilistic social contingencies, of the utility and/or operationality of social concepts, or of the existence of general principles concerning the social universe. These objectives are by no means mutually exclusive; yet not all games serve all objectives. Certainly most games do not serve them all well. For example, as a teaching tool, the value of a game to students may increase when its scope is enlarged, while the value of that game to those interested in policy-oriented research is degraded.[3]

One may characterize simulation games by their structure. The rules of the game, or lack thereof, are crucial to that structure. James S. Coleman has categorized game rules as:

1. goals developed by and/or imposed upon the participants

2. environmental response rules, wherein the rules substitute for that portion of the social system not directly represented by the participant teams in the simulation

3. procedural rules, describing how the game is to be put into play and the general order in which play proceeds

4. behavioral rules, corresponding to role specifications, describing what the participant can and cannot do

5. police rules, outlining the consequences of breaking one of the game's rules[4]

The principal simulation games vary according to the abstractness, detail, scope, restrictiveness, source, and time of specification of each of the above.

The rules of INS, the most widely used of the present international educational simulations, are quite abstract and detailed; but the detail still allows great flexibility by both the control group and the

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3. Goldhamer and Speier; p. 272.

4. James S. Coleman; "Simulation Games and Social Theory"; Report Number 8 of the Center for the Study of Social Organization of Schools, Johns Hopkins University, Baltimore, Maryland; 1968, pp. 6-10

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participating teams. POLIDOX (political paradox), the principal international simulation game now in use at the Air Force Academy, is as abstract and only slightly less detailed in its rules. Flexibility remains high. POLIDOX contains a unique feature in the area of goal-setting. Within limits, the student teams create their own "national interest" at the beginning of play and then are graded according to the congruence of "international" outcomes to that interest. By contrast, the Joint War Games Agency (JWGA) games do not set up a complex, detailed rule framework. Rather, most of the guidance affecting the flow of the game is ad hoc, flowing almost solely from the good judgment and experience of the control group. The early RAND games and the POLEX games at MIT follow a similar pattern.

The simulation game universe is comprised of more than rules. The living portion of the game structure can be categorized and compared at three levels: the team system, the internal structure of the teams, and the participants that make up the teams. Team systems can be characterized by their abstractness, the number of actors directly represented, inter-team internal homogeneity, the distribution of power and other attributes, and the communication systems provided to the teams. The system represented in INS is quite abstract, as is the one in POLIDOX, although both may be structured to approximate the power distribution and other attributes of an historical system. The POLEX, RAND, and JWGA systems are less abstract in the sense that the actors and their power relationships are as they are today, but the actors are frequently called upon to deal with a set of hypothetical events. Dangerous Parallel, a crisis game developed by the Foreign Policy Association, is at once more abstract and more concrete. It is a disguised simulation of the outbreak and conduct of the Korean War. Empire, an international trading game designed by Abt Associates, Inc. to increase understanding of the trade relations in the British Empire circa 1735 is the most concrete of all. An historical system is explicitly created and rigidly controlled to conform to the situation then extant.

The internal structures of the teams vary as much as do the team systems from game to game. However, for purposes of research into the efficacy of simulation games, the formal structuring of teams may not be an important variable. It seems to have less impact on behavior than does the formal structuring of the system. Regardless of role and decision rule specifications, teams tend to fall into unique organizations based on informal relationships developed prior to or during play.[5]

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5. Reported several places in the literature, and experienced at the Air Force Academy games.

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Finally, the structure of simulation games differs according to the type of participant. Participant characteristics vary from game to game. INS, for example, has been played with facility by homogeneous and heterogeneous mixes of participants ranging from grade school to post-graduate level, from layman to expert, and from aggressive to cautious personality types. On the other hand, a game like Empire is definitely best suited and normally used to educate participants at the elementary and secondary school levels.

Dynamic, interactive characteristics of games differ as much as those of structure and should, it would seem, be as important to learning outcomes. Initial scenarios can be dichotomized into crisis and noncrisis situations. In INS and POLIDOX crises, if they occur at all, are developed out of the internal dynamics of the game, while crises are imposed at the outset in POLEX and most high-level policy games run by the JWGA. Once any game begins, interaction can be influenced by the role assigned to the control group, either active or passive. If assigned an active role, the control group can direct communication, inject nonteam generated inputs into the system, and otherwise guide the flow of the game. Other important influences on the nature of interaction are the ease and means of inter- and intra-team communication; the number, length, and spacing of play periods; the privacy of team areas; the permissible instruments and arenas of interaction; the tempo of game time; and several other factors, many of which have little to do with the particular game being played and much to do with the immediate circumstances surrounding a particular play.

Much needs to be done to specify which of the variable characteristics of games and their settings may be significant for learning and research outcomes. These characteristics would be the independent variables in the rigorous experimental work that needs to be accomplished. A preliminary survey of the literature does reveal a few, which will be touched on later. Generally speaking, however, most claims to the advantages or disadvantages of simulation games do not bother to specify conditional factors such as particular simulation characteristics and situations of use.

Advantages

Supporters claim that games remove certain impediments to learning that occur, especially, but not exclusively, at the secondary school level:

> Dr. Coleman has pointed out the learning advantages that result when penalties are imposed by rules of the game or peers instead of by authority figures. Too often rebellion or hostility toward adult . . . society interferes with learning . . . . In the

simulation environment the teacher is without authority, often a mere bystander; so whatever lessons students learn come from the game itself.[6]

Not only must the student be freed from a motivation not to learn, he must also be motivated to learn. Simulation games have been highly praised for their facility in motivating the student to become more active in the game, and hence to learn whatever there is to be learned directly from participation; to go beyond the game during its play by reading substantive material in depth so as to learn how to survive in the game; and to continue to delve into the substantive material after the game is over because of the new interest evoked by the game through involvement and a new sense of efficacy. Examples of all these behaviors are to be found in the literature. Most sources agree that the first type of motivation leading to active participation is normally exhibited.[7] With regard to the second, one finds such favorable reports as "some students were more willing to read books like The Federalist Papers [in the U. S. History simulation "Disunia"], since the knowledge used from such reading could be used in the game." Similarly, in another game setting, students have sought information beyond the curriculum to help them succeed.[8] Evidence of the third type of motivation is contained in the following observation made about an international relations simulation undertaken at University College London:

The odd student that inevitably gets into a class and who is not greatly interested soon becomes involved in simulation--and he turns up to other classes because his interest is stimulated.[9]

Aside from being motivated, what does the player of a game learn from the simulation experience? He is said to learn useful and/or desirable attitudes and values vis-á-vis himself, and economic, social,

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6. William S. Nesbitt; "Simulation Games for the Social Studies Classroom"; The Foreign Policy Association, New York, N. Y.; 1968, p. 34.

7. For example, see Jerome S. Bruner; "Toward a Theory of Instruction"; W. W. Norton and Co., Inc., New York, N. Y.; 1968, p. 95.

8. Elliot Carlson; "Learning Through Games"; Public Affairs Press; 1969, pp. 158 (quote), 120.

9. John W. Burton; "University of London: Simulation in the Teaching of International Relations"; U. C. London, London, England; 1965.

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and/or political systems and subsystems with which he will need to interact. These tend to build one on the other. The depth of involvement of the individual student in a game and his ability to test theories about the simulated system in which he operates and about how to manipulate it successfully may serve to:

> . . . modify certain dimensions of the personality of the individual--his self-esteem, his self-confidence and feelings of efficacy, which are known to be important variables in the political behavior of the adult . . .[10]

The principal positive behavioral result is a propensity to participate in social life. Although there is a danger that overconfidence will be bred in games, most introduce an element of fortuna "to replicate the real world and teach the student that it is not completely amenable to his manipulation."[11] Even when the game world proves susceptible to student manipulation, gaming can prove to be a sobering experience similar to one undergone recently by a cadet in the POLIDOX game:

> When the game first began everyone was calm because we all knew where we stood and had decided that we'd play the negotiation game . . . .
>
> Once individual desires or goals became hemmed in by other nations' objectives negotiations went out the window . . . .
>
> The situation was very real. It allowed us to display our ineptness at functioning in a rational manner. It displayed perfectly our inability to compromise and think maturely when the pressure was on . . . .
>
> . . . I would suggest requiring all cadets to play Polidox. Why? Because it scares me to see how unprepared we are to cope with real life situations and perhaps the game can open up a lot more cadet minds to our inability to live in the 21st century as we think we are so very capable of doing.[12]

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10. Philip M. Burgess and James A. Robinson; "Political Science Games and the Problem-Solver State," Boocock and Schild; p. 247.

11. Nesbitt, p. 35.

12. David J. Palenchar; "Comments on POLIDOX"; USAF Academy, by the author; 1969, pp. 1-2.

The involvement, role identification, success, and frustration experienced in games may have beneficial effects beyond encouraging social participation. They may also serve to mitigate pre-adult disaffection from today's policy elites and the restraints and choices imposed by the social systems with which those elites must deal. Similarly, in the research area such intense involvement of identification may serve to generate an unusual number of tentative hypotheses with regard to social theory on the part of the players, which can be transferred to researchers in a properly designed critique session.

What of the impact on the participant's attitudes toward social systems? Not a great deal has been said in the gaming literature about this aspect of attitudinal socialization. What little has been reported is mostly negative. Findings in other areas of educational research, however, would tend to indicate that games, through the intimate involvement that they often foster among as well as within teams, might have a positive impact analogous to the one described here:

> . . . special types of curricula may have greater influence [on attitudinal socialization]. American students who learned about West Africans by reading only historical and geographic accounts expressed more social distance from the Africans, and a desire to maintain such distance, than did a class who read about the daily lives of the people, the problems they faced, and the help being given them through international aid bodies.[13]

Such an impact may be very different from that which one would expect through social interaction in the real world. Hence certain research ends may be less well served through this effect than socialization objectives. Much is claimed by enthusiasts for simulation games as instructional devices along another dimension. For example:

> . . . [In the past], when games and play have been accepted as appropriate for the classroom, intention has primarily been to arouse interest and to motivate the student to further study . . . . [Many] games [in use today]. . . are intended to <u>teach</u>, as they are, just as a chapter in a textbook or a lecture can teach.[14]

The content of what is learned does not seem so much to be specific facts, or even particular generalizations about international behavior (although there is some testimony to this type of learning in the

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13. Richard E. Dawson and Kenneth Prewitt; "Political Socialization"; Little, Brown and Company, Boston, Massachusetts; 1969, p. 151.

14. Boocock and Schild; p. 14.

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literature from teachers and students alike).[15] This at once tends to call into question the value of historical games like Empire and to lessen the criticism of other games concerning their lack of isomorphism to reality. What simulation games do offer, at least in the field of education, according to the literature, is an excellent medium for the integration of facts and principles about social systems learned elsewhere, and above all a vehicle to aid the student in conceptualizing on a systemic level.[16] For example, "students do not simply learn about the balance of power; . . . they experience it.[17] If a game is not isomorphic with reality, if it does not, for example, accurately represent the behavior that is characteristic of a balance of power system, if that is the intent of the simulation, all is not lost. Gamers would point out that the researcher, or the properly prepared and guided student, may learn as much or more in critiquing the game, comparing it to reality, and then engaging anew in a model-building or refining process.[18]

Perhaps more important than the discovery, verification, or inculation of social facts and principles through simulation games is the development or discovery of skills or hypotheses regarding decision-making, manipulative, and interactive behavior. With regard to training uses, this relates to what was said earlier concerning the socialization of the participants in games through realistically increasing their sense of efficacy. That sense largely derives from player-perceived acquisition of new skills. Many reporters would agree that such skills are actually acquired. For example, in the case of the Carnegie Tech management game (admittedly more explicitly designed for training decision-making and implementing skills than most games):

> . . . the participants became more sophisticated about abstracting, organizing and using information from a complex and diffuse environment. Also, they became better at distinguishing between valuable and trivial information, and finally, they became more

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15. Clark Abt; "Twentieth Century Teaching Techniques"; The Faculty, XXX; August, 1966, p. 2.

16. Sarane S. Boocock and James S. Coleman; "Games with Simulated Environments for Social Studies"; Department of Social Relations, Johns Hopkins University, Baltimore, Maryland; n.d., p. 15.

17. Nesbitt, p. 32.

18. Western Behavioral Sciences Institute; "An Inventory of Hunches About Simulation as Education Tools"; WBSI, La Jolla, California; 1965, p. 1.

> effective at coordinating information and actions between the separate functions of marketing, production and finance.[19]

If the above testimony is not too unrepresentative--E. O. Schild would say that it is not--and if Burgess and Robinson are right that the coming age will be one of the dominance of the professional decision-maker, then the learning of decision-making and implementing skills may be the most important educational outcome achieved through simulation games.[20] Similarly, the opportunity to observe the application of decision-making skills in different situational contexts may lead to the most important and valid research application of simulation games.

Whatever facts, principles, strategies, or skills may be discovered, tested, or learned in games, these occur with a higher probability of perception or retention than in the case of similar items of knowledge and insights obtained through more traditional teaching and research techniques. According to Andrew M. Scott:

> . . . the chances are that information acquired while the individual is under stress and is emotionally involved is likely to be internalized more fully than information acquired more casually.[21]

Unless a researcher is a player, however, this benefit is only indirectly obtained through the critique session mentioned earlier.

Previously, we mentioned a few tentative differentiations that can be made in the literature concerning the relation of learning and research outcomes to participant characteristics. A few observations might be made at this point with regard to variations in participant types. The needs and the levels of motivation, socialization, knowledge, and skill of both students and the practitioners differ vastly. Beyond certain limits, as yet undefined, some games would thus seem to be appropriate for one group but not for another. Simulation game enthusiasts would claim, however, that the limits are fairly broad, and that one of the truly outstanding and unique features of simulation games in education is that they "equalize or compensate for differ-

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19. Carlson, p. 43.

20. E. O. Schild, "The Shaping of Strategies," in Boocock and Schild, pp. 143-154; Burgess and Robinson, pp. 243-249.

21. "Simulation and National Development"; University of North Carolina, Dept. of Political Science, Chapel Hill, N. C.; 1965, p. 14.

ential student status or background and experience."[22] Each student has the opportunity to order information in the particular way and at the particular level it makes sense to him. As Ronald C. Klietsch of Instructional Simulations, Inc., puts it:

> . . . information in simulations is not provided in any form, in any sequence until the participant is ready to do something with it.[23]

By contrast, when a teacher lectures or writes a syllabus he is saying, "This is the best way to learn this subject."

When games are used for social science research, on the other hand, some groups would be appropriate for one game or one research aim but not another, and the limits may not often be very broad. For example, advanced students and practitioners might be desirable to replicate real-world social systems, while the uninitiated, with their "unchanneled" minds, might be preferable to explore hypothetical social arrangements.

And all of this at less cost! Or at least so some enthusiasts would have us believe. Time, facilities, money, and personnel are all claimed to be required in not much larger, and in some cases smaller, amounts than is the case with traditional techniques used for teaching and research in the same substance at the same or a lower level of effectiveness.[24] But, surely, simulation games cannot be as good as all that.

Disadvantages

A careful search of the literature will produce a list of disadvantages which is, point for point, a mirror image of the list of advantages. To cite a few examples, most accounts of simulation games report that the participants were intensely interested in and motivated by the experience, but some teachers who have tried the technique

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22. Carlson, p. 121.

23. Ronald G. Klietsch; "An Introduction to Learning Games and Instructional Simulations"; Instructional Simulations and Co., Newport, Minnesota; 1969.

24. Carlson; "Description of the Program of Instruction for Use with the 'International Relations Simulation', p. 156; n.d., p. 2 and other sources.

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report that a number of students experienced only boredom.[25] Despite assertions in the literature that the game participant is socialized to become an active participant in social processes, one may find contradictory impressions to the effect that "the danger arises that games--most of which mirror political and economic institutions as they are--may encourage quiescent and conformist attitudes."[26] Although enthusiasts stress the integration of knowledge and the systemic perspective achieved through gaming, other reporters claim that the student or researcher either is inculcated with a grievously incorrect perception of the real world system,[27] or that no systemic perspective is achieved at all: "students do not discover structural relationships in the simulate, they memorize them.[28] Some commentators would disagree with E. O. Schild's assessment of the efficacy of simulations in training participants for political decision-making:

> The competitive aspects of a . . . game . . . do arouse motivation and help sustain effort. But they may also detract from long-term learning by teaching students to play conservative strategies instead of experimenting with new approaches, to emphasize short-term profits within the game context at the expense of building and trying to achieve long-term strategic plans, and to let anxieties about relative performance and grades interfere with efforts to learn.[29]

The disparity in reports of the supposed advantages and disadvantages of simulation games cries out for explanation. Our review of the literature on gaming in the classroom and laboratory suggests three possible factors, any or all of which might provide that explanation. First, reports of educational experience with simulation games are generally unencumbered by objective data. (Researchers, attuned to the scientific method, seem less often prone to be this casual about the technique.) The principal substitute in support of claims advanced in

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25. See Bernard C. Cohen; "Political Gaming in the Classroom," Journal of Politics, XXIV; May, 1962; pp. 371-372.

26. Carlson, p. 173.

27. Ibid., p. 176.

28. Nesbitt, p. 42.

29. James L. McKenney and William R. Dill; "The Effects of Team Assignment and Faculty Boards on Student Attitudes and Learning," in Simulation Games and Learning; ed. by Sarane S. Boocock and E. O. Schild; Sage Publications, Inc., Beverly Hills, California; 1968; p. 230.

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favor of simulation games is logical deduction from theories of learning. These theories maintain, for example, that motivation is a necessary prerequisite to learning and that tangible reward or punishment enhances motivation. Those who believe in the utility of gaming reason that the rewards or punishments which games provide are more immediate and tangible than those provided the student by traditional teaching methods, and they then go on to conclude that simulation games produce greater motivation than traditional teaching techniques, and hence are better learning tools.

In defense of those who rely upon deductive argument to support their claims, we should point out that empirical tests necessary to provide an objective answer are not so easy to construct as one might first believe. What is the proper test of acquired knowledge? Every teacher has struggled with that question. We are fairly confident of our ability to devise tests which measure factual knowledge, but less confident of our ability to test for knowledge of concepts or the assimilation of theoretical models, the more frequently claimed outcome of games. Employing the usual methods for testing social science knowledge thus may bias the results of a closely controlled experiment designed to measure and compare the knowledge acquired through gaming with that acquired through traditional teaching methods in favor of the latter. Is there a fair test of conceptual or theoretical knowledge? To have the student restate the definition of a concept, he has memorized may not really test his understanding of that concept in use. Yet, it is the latter which the experience of simulation games is supposed to contribute to the student's education.

In research, a related problem arises: can one ever be sure that the elements relevent to a concept or the variables acting within a system are present? Replication of a historical event or condition may be possible in a game as a check but this does not mean that all elements or variables acting to produce that event or condition in the real-world are present.

Some empirical studies have been attempted in educational applications, most treating simulation at the secondary school level. For the most part, these tests have concluded that no significant differences exist between the knowledge acquired by the control group subjected to traditional teaching methods and the knowledge acquired by the group exposed to a simulation game.[30] Still, one should be cautious in interpreting these results. Perhaps the "no difference" findings were the result of an inappropriate test of the kind described above.

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30. See Nesbitt, pp. 41-42 and Carlson, pp. 171-172.

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If new empirical studies have been accomplished, how do advocates of gaming justify their position, other than, in the case of educational uses, by deduction from learning theory? The usual justification takes the form of a subjective evaluation. In education, teachers incorporate a game in their course and observe the game's effect upon the students. This type of appraisal generally is accomplished in conjunction with an end-of-course questionnaire administered to students in order to discover their subjective judgement of the gaming experience. The teacher then concludes that the "experiment" with simulation was a success (or a failure) and cites appropriate "typical" commentary from the questionnaire as evidence. Researchers who have used games and reported favorably on the results usually have experimented with the method in conjunction with other techniques. Perhaps in so doing they have attempted to guide the course of events in the game to correspond with the results derived elsewhere, and have concluded that games "added significantly," but usually no more than heuristically, with their usual research task. This method of evaluating the utility of simulation games leads us to a second explanation for the confused picture presented by the literature on gaming in the classroom and the laboratory.

Reports of the actual use of simulation games tend to fall into one of two categories--very favorable reaction or very unfavorable reaction. In terms of quantity, most accounts fall on the favorable side of the ledger. Bernard C. Cohen has suggested a reason for this. He asks if possibly those who direct games and conclude that the experience was worthwhile might have approached their evaluation with a preconceived bias in favor of simulation. Lacking objective criteria, such individuals may see in the simulation only "the evidence which confirms their wisdom in conducting the exercise."[31] A favorable predisposition toward gaming may bias not only reports of results but the results themselves. The effect of games in the hands of the enthusiast may be impressive, but the average teacher may not be able to produce the same kind of results. Similar reasoning might explain the reports of unfavorable experiences. If the experimenter begins his evaluation skeptical of the value of simulation games, his bias might both adversely affect his conduct of the games and color his subjective judgment of results.

If the above chain of reasoning is sound, the subjective nature of most evaluations of the utility of games coupled with the tendencies to effect learning and research outcomes in the manner of a self-confirming hypothesis and then to read the evidence through the tinted spectacles of preconceived bias provides the second factor which might explain the conflicting reports of classroom simulations.

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31. Cohen, p. 371.

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There is still a third explanation. Most teachers and researchers who have experimented with the simulation technique have had direct, personal experience with only one, or at most two or three, different types of games; yet the scope of their conclusions generally claim or imply application to all games. Different games, however, may have different learning or research outcomes. In fact, we suspect that this would make a better initial assumption than the opposite, that all simulation games no matter what their structure have the same influence upon outcomes.

Having criticized others for asserting conclusions about the relative worth of gaming on the basis of inadequate empirical data, we shall now proceed to make the same error. Simulation has been done at the Academy for over five years. We have not yet used games in any systematic research effort, nor have we made a systematic investigation of the teaching value of the games we play. We have only personal, subjective judgments to offer about the utility of games, judgments of our students as well as ourselves.

Our experience suggests that simulation games suffer from three serious weaknesses. First is the lack of control which the teacher has over what is learned during the game or the instructor would have over certain kinds of variables worth investigating. In education, we are satisfied that the majority of players learn the "right" lessons from the game, the lessons we intended them to learn. But now and then we discover a student who has learned the "wrong" lessons. Traditional teaching methods include making certain that students learn the "right" lessons by telling them explicitly what the "right" lessons are. While simulation games are supposed to be a superior teaching technique in that the "right" lessons are discovered by the student himself through a process of trial and error in the simulated world, at times the simulated world, like Frankenstein's monster, develops a will of its own, takes off in a direction unintended by its author, and begins to spew forth all sorts of "wrong" lessons. When this occurs the teacher has a difficult time "correcting" the learning experience of the student. After all, if it is true that living through the experience of a simulated world plants a lesson more firmly in the minds of a student than does reading about that experience, then it is true that "wrong" lessons may be planted equally deep during the play of a game. In research, needless to say, it is even more difficult to correct the "wrong" lessons than in teaching, in that one is less certain what the "right" lessons are. Overly controlling to ensure the "right" lessons may simply be an exercise of insuring self-confirming hypotheses.

The second disadvantage we have encountered is the problem of arranging student or subject schedules, class or subject group size, and the physical setting required for a game. To those who extol the

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virtues of gaming these are minor problems. They claim that "simulations do not require the use of facilities or equipment beyond what is present in almost every school or what can borrowed or fabricated by resourceful students and teachers."[32] For others, "simulation can be a complicated procedure requiring space and equipment."[33] We stand with the latter group.

It is true that if students and teachers are sufficiently motivated to try a simulation, the necessary time to conduct play can be found on weekends and evenings if schedules will not permit play during regular class hours. It is also true that imagination and ingenuity can go a long way in adapting existing physical facilities to what is required in order to play a particular game. Nevertheless, these matters take considerable time to arrange and must be counted as a liability in using the simulation technique. Furthermore, we should like to stress that physical arrangements are seldom if ever neutral in their effect upon the game. Whatever physical arrangements are chosen introduce a kind of artificial geography into the structure of the game which the experiences of others as well as ourselves have shown bear important consequences.[34]

The third disadvantage of simulation games is the cost of gaming in terms of the teacher's or researcher's (and sometimes the student's) time. Here again there is disagreement. Some who experimented with the technique conclude that "larger numbers of students can be taught effectively with no increase in staff."[35] We disagree. Our experience with games has been that it is quite expensive in terms of the individual supervisor's time and in terms of the supervisor-participant ratio which games require. During the play of the game, the supervisor must monitor events, make on-the-spot rulings unanticipated in the design of the game, and otherwise act as a judge and final authority as to how the game rules are to be interpreted and applied. As mentioned previously, it takes time to make the necessary physical arrangements. Between periods of play the game supervisor is often engaged in performing numerous calculations of results.

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32. Hall T. Sprague; "Using Simulation to Teach International Relations"; WBSI, La Jolla, California; n.d., p. 114.

33. Burton, p. 4.

34. For example, see Cohen, pp. 377-378.

35. Burton, p. 4.

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Of course some games are more demanding of the teacher's or researcher's time than others. A carefully constructed game which has been refined and "debugged" by way of several replications might be handled with ease by one person. Computers can reduce the time necessary to keep books and make computations, but may result in trading one type of cost for another.

Conclusions

It would be presumptuous to advance conclusive propositions on the basis of this working paper. We have no firm conclusions to state at this time. We have only vague hunches about the value of simulation games in teaching and research, and our hunches tell us that something of value is there. Final answers must await the empirical research in which we ourselves are engaged which would encourage others to undertake.

Our present research efforts include the development of a questionnaire to be distributed to those members of the academic community, government agencies, and private research organization we can identify as having had experience with simulation games in the social sciences. This questionnaire will provide survey data which will be used to refine a descriptive typology of simulation games, their applications, their circumstances of use, and their users. By means of this questionnaire we also intend to survey gamers concerning their subjective and, where possible, objective assessment of both the absolute and relative advantages and disadvantages of the gaming technique.

We seek more than description. We plan to use the data garnered from the survey effort to relate the descriptive characteristics mentioned above to learning and research outcome experienced by the respondents, which we will take to be a representative sample of the gaming universe. Our ultimate aim is to identify independent and dependent variables relating to the use of simulation games, to infer causality, and to establish norms for game use based on the inferences that we derive. In particular, we hope to be able to point out the opportunity costs and benefits of the use of simulation games in areas of social science teaching and research already at least adequately dealt with by other techniques and to identify absolute costs and benefits in areas in which no other adequate tools exist.

Why do we set this task for ourselves? First, we are subjectively convinced of the value of gaming from our own experience here at the Academy. Second, even if we were convinced by the arguments of the skeptics and the debunkers, which, to some extent, we have been, we might still feel the present effort was worthwhile. As one disappointed experimenter with simulation games wrote seven years ago:

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> . . . an enterprise which requires such a heavy investment of time, effort, and resources as this does, ought to have a predictably high return. It would be hard to claim that such a point has been reached at the present time, although one can go a step further and argue that it will never reach such a point unless there is further 'experimentation' with, or, more properly, development of, the technique. (italics added)[36]

All the votes have not been cast on the question of whether or not simulation is worth it all. We hope to make the ballot box available. While there may be only a small chance that simulation games will eventually provide the breakthrough they promise, we are convinced that the potential returns make it worthwhile to take that risk.

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36. Cohen; p. 380.

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